

**Amendments to the Claims**

This listing of claims will replace all prior versions, and listings of claims in the application.

Claims 1-18 (Cancelled)

19. (Previously Amended) A reactor comprising
- (a) a reaction zone; and
  - (b) a heat exchanger in operative contact with the reaction zone so as to receive reactants for heat exchange purposes, wherein the heat exchanger is formed from a heat exchange panel that includes a plurality of superposed metal printed circuit heat exchange (PCHE) plates bearing fluid flow channels, the channel-bearing PCHE plates being (i) aligned during superposition to define discrete heat exchange pathways for fluids, and (ii) diffusion bonded together.
20. (Previously Added) A reactor according to claim 19, wherein the reaction zone comprises at least one catalyst bed.
21. (Previously Amended) A reactor according to claim 19, wherein the fluid flow channels are formed by chemically etching the channel-bearing PCHE plates.

22. (Previously Amended) A reactor according to claim 19, wherein the fluid flow channels are formed by hydraulically milling the channel-bearing PCHE plates.

23. (Previously Amended) A reactor according to claim 19, wherein multiple heat exchange panels are embedded within the reaction zone, and wherein a contact face area of the panels is generally equal to a contact face area of the reaction zone.

24. (Previously Presented) A reactor according to claim 19, wherein a plurality of reaction zones are arranged succession, and wherein a heat exchange panel is arranged between each set of adjacent reaction zones.

25. (Previously Presented) A reactor according to claim 24, wherein at least three reaction zones are arranged in series.

26. (Previously Presented) A reactor according to claim 24, wherein the heat exchange panel has a thickness of up to about 100 mm.

27. (Previously Presented) A reactor according to claim 19, wherein the heat exchange panel includes passages comprising tortuous pathways with one of convolution and zigzags.

28. (Cancelled)

29. (Previously Presented) A reactor according to claim 19, wherein the reaction zone comprises a catalyst bed including a variable form catalyst.

30. (Previously Presented) A reactor according to claim 19, further comprising a screen that restrains catalyst particles from entering the passages of the heat exchanger panel.

31-47. (Cancelled)

48. (Previously Presented) A reactor according to claim 19, wherein the fluid flow channels are formed with a tool.

49. (Previously Presented) A reactor according to claim 48, wherein the fluid flow channels are formed with a water jet.

50. (New) A reactor according to claim 19, further comprising:  
a reactant fluid inlet;  
a reactant fluid outlet;  
first and second adjacent catalyst beds each including a catalyst; and  
at least two channels that are formed in the PCHE that are separated from one another, the first channel permitting flow of reactant fluid from the first catalyst bed to

the second catalyst bed, and the second channel permitting flow of a heat exchange fluid therethrough.

51. (New) A reactor according to claim 50, wherein the reactor is a moving bed reactor, and wherein a catalyst outlet is provided adjacent a lower end of each of the catalyst beds such that the catalyst can be urged through the catalyst outlet by gravity and catalyst can be passed through the catalyst inlet.

52. (New) A reactor according to claim 50, further comprising an additional heat exchanger in communication with the reactant fluid inlet, the additional heat exchanger containing pre-heat channels.

53. (New) A reactor according to claim 50, further comprising a fine mesh that covers ends of the channel adjacent the catalytic beds.

54. (New) A reactor according to claim 50, wherein the heat exchanger is formed from plates, the plates being diffusion bonded together.

55. (New) A reactor according to claim 50, wherein the heat exchanger includes passages comprising tortuous pathways with at least one of convolutions and zigzags.